THE USE OF API (APPLICATION PROGRAMMING INTERFACE) FROM THE MINISTRY OF EDUCATION AND CULTURE IN BUILDING AN ANDROID BASED APPLICATION FOR CULTURAL TOURISM IN INDONESIA

Ricki Wahyuardiyono

Teknik Informatika – Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
E-mail : rickisandro@gmail.com

ABSTRACT

The Ministry of Education and Culture of the Republic of Indonesia (Kemdikbud) is the ministry which organizes the Indonesian government affairs in the field of early childhood education, elementary education, secondary education, and public education, and management culture to help the President in running the state government. One media education should still be preserved is the cultural attractions such as museums, cultural heritage, art galleries and others.

Data Portal Indonesia (Data.go.id) is the official portal of open data. This portal contains data ministries, government agencies, local government, and all other agencies concerned which produces data related to Indonesia. The data is provided in a format that is easily searchable, accessible and used, the data format API (Application Programming Interface). One of them is the museum of the data from the Ministry of Education and Culture (Kemdikbud).

Based on the test results it can be concluded that the data museum on Data Portal Indonesia that have been processed into information combined with technology geofencing through the results of testing of applications that do it can be concluded that the system of mobile software that is built has been running as expected both in terms of testing blackbox nor of beta testing.

Keywords: Data Portal Indonesia (data.go.id), Mobile, API, Museum, Geofencing.

1. INTRODUCTION

Museum as one of the cultural tourism is a means to develop a culture and civilization. In addition to its perceived directly when visiting the museum, other benefits in the form of awareness of the importance of history and civilization of a nation as a medium of representation for future generations to come. If the number of museum visitors decreases, resulting in less maximal operational funds so that treatment is less than optimal collection. This condition is caused due to lack of facilities and infrastructure such as lack of information about the museum.

According to a talented team of We Are Social quoted id.techinasia.com, level of activity and interest in smartphone users in Indonesia is high. Based on statistical article Internet users in Asia and Indonesia, more than 90% of smartphone users search for product information through their smartphones, resulting in business in Indonesia focusing on this device especially android platform [1]. Ease and speed of getting information is a crucial thing in the presentation of information, especially for information that provide location-based services. Geofencing is a mobile service by sending a message to the Android smartphone users who enter a predetermined area. Geofencing technology can be used as information and promotion of tourist attractions, where to eat, dress shops and other places to customers and visitors through Android smartphone.

Public data from the Ministry of Education and Culture (Kemdikbud) itself has been provided in the Data Portal Indonesia (data.go.id) in a format that is easily searchable, accessible and used, the data format API (Application Programming Interface). Writing the data format using certain notations such as brackets, braces, colons, quotation marks, and commas. Writing with notations that would be difficult to read by a layman, because the data format was created as a way to provide a service or data to third party application developers. The data are available in a particular format is taken to be processed and then presented as an information.

2. CONTENTS OF RESEARCH

2.1 System Architecture Analysis

The analysis aims to identify the system architecture architectures to be built in this case using a mobile. The mobile platform is one of the subsystems selected for the development of this software. Architecture software on the mobile platform describes how the software interact with each other as illustrated in Figure 3.1 Architecture Software on Mobile Platform. The image depicts the overall architecture of the system on the mobile platform.

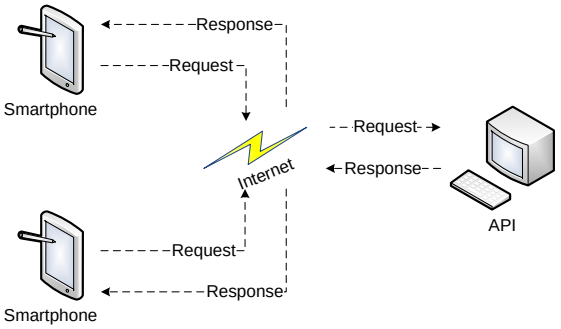


Figure 3.1 System Architecture

2.1.1 Geofencing Technology

Geofence is a virtual parameter for the geographic area in the real world. Virtual parameter set can be static or dynamic. One typical example of a dynamic geofence is a radius around the store or point locations. static geofence can be set from a predetermined limit, such as school attendance zones or environmental limits. Costume digital geofencing can also be used, if the device that provides location-based services (LBS) users enter or exit geofencing, the device will receive a notification message. This notification may contain information about the location of the device. Geo-fence notifications may be sent to your phone as an example of improving any other form of action.

We could describe as geofencing LBS proactive. In many cases the proactive system is much more convenient than reactive, in which the user must explicitly request the data for the location. There are many different types of events to correct the location of the GPS position that can be tested. For example, if the user is near to the point of interest (POI) or to other users.

Geofence now become one of the new faces in the Location Based Services. Now the original development of LBS itself is more or less complete. We can see some common standards and applications (think about the implementation of services like Foursquare Places, Twitter places, Google place, Facebook place, etc.) All of them allow you to share your location information or to get a few things that are nearby. Geo-fence and opened the door for some personalization. You can get some custom tailored to the data in the right place, especially when both the data stream and (area) to receive the dynamically generated. In the second, geo-fence will be integrated in the nearest future with sensors and M2M applications. [6]

2.2 Geofencing

Geofencing is a feature in the software program that uses the global positioning system (GPS) to determine the geographic boundaries. Programs that combine the geofencing allows to set triggers, so that when an object using a particular device entering or leaving the boundaries are set, it will display a notification (notification) to be sent to the user's application of the geofencing feature.

Broadly speaking, the geographic coordinates are used to limit a particular area (mapping) as a virtual fence (geofence) an area. This system determines the tracked object is located inside or outside the territory geofenced. A notification will appear when the object entering or leaving the geofence area. This technology can also allow for the detection of proximity between the phone and tracked with certain geofenced area.

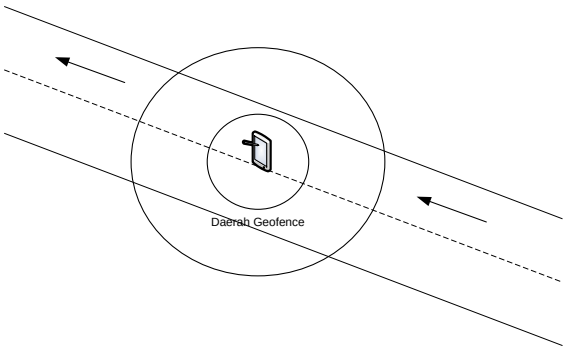


Figure 3.2 Geofencing

In Figure 3.2 A has been in the geofence area. So when there is a museum tour into the area which has been at the geofence, it will display a notice on the smartphone in the form of information.

Geofencing can be applied to various fields related to the monitoring of people, vehicles and information. The main thing that is developed for the information sector. However, this application can also be applied to civilian safety, security, transport or public works sector.

2.3 Geofencing Areas

For the size of the area in geofence range from a few tens of meters to several kilometers. Geofence area in the form of irregular, shape can be a circle, geometric figures, such as square or rectangular, or more complex, such as complex polygons.

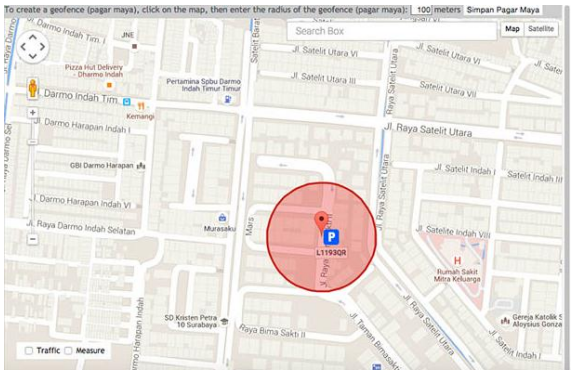


Figure 3.3 Geofencing Areas

2.3.1 Determination Mechanism Point

Geofencing mechanism to determine the point to be in geofencingkan is to first determine the latitude and longitude that you want to give geofencing, after getting latitude and longitude, and then specify the radius that want to be included, defined radius permeter this term.

2.3.2 Mechanism Acceptance Notification Log

This technique is intended to detect the user who enters the area geofencing.

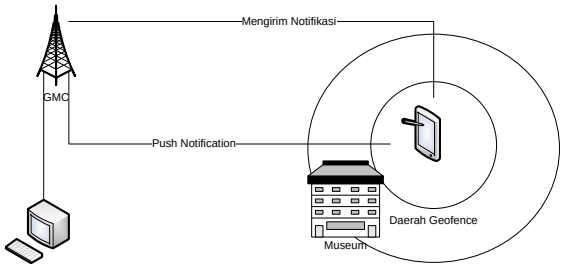


Figure 3.4 Receipt Mechanism Geofencing

In Figure 3.4 a museum tour into the area that has been in the geofence. Then, the detection occurs when smartphone users entering areas in geofence, planting in the application smartphone users give Push Notification via Google Cloud Messaging (GCM), which then sends back information GCM events and promotions in the geofence to mobile users. Following are the features - in the geofencing feature:

a. Area (Zone)
Geofence area are the boundaries of virtual / imaginary created by users to limit the area or a specific location. Super Spring GPS Tracker will analyze, create reports and send alerts when necessary, if the vehicle is in or out of the area.

b. check Point
Check Point is the places that have been specified by the user that must be addressed by a vehicle. Super Spring GPS Tracking Device will send alerts when vehicles enter and exit from Check Point.

c. POI (Point Of Interest)
POI is the locations where the vehicles are in these locations, can be stored in the database, making it easier to track in the future. To facilitate the POI can be converted into Check Point.

d. Odometer Tracking Device automatically record total distance traveled by the vehicle. The distance is calculated based on the change in position of the vehicle from time to time. Odometer value reported to the tracking server together with the position data, speed, direction and status of I / O. Odometer antaralain can be utilized to analyze:

1. Mileage an overall vehicle / per trip journey.
2. Calculate the ratio of vehicle mileage with fuel consumption.
3. Assist regular vehicle maintenance planning.

2.4 API (Application programming Interface)

In this android app usage and objeck involve elements essential to the Google Maps API which is applied to the application museum tours:

1. *Location Manager (API Maps)*
   API is the most important, in providing access to the service system with mapping and GPS location. In this case the Location Manager to work to get periodic updates geographical location of the device to map latitude and longitude values into Google Maps.
2. *Location Provider (API Location)*
   Provide a location search technology used by the device or devices. Location API dealing with data GPS (Global Positioning System) and real-time location data. API Location how the android package that is in the package android.location. By Location Manager, we can determine our current location, track movement or displacement, as well as proximity to a specific location by detecting the displacement

2.5 Application of API (Application Programming Interface)

In making this application will take advantage of the API data derived from data.go.id, the data used is "Data Museum Indonesia By Name". Here is Figure 3. Data Museum:

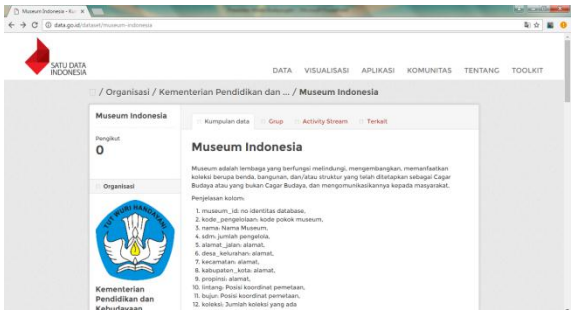


Figure 3.5 Data Museum

Sample data:
http://jendela.data.kemdikbud.go.id/api/index.php/CcariMuseum/searchGET?nama=museum. Here is Figure 3.6 Data API Museum:



Figure 3.6 Data API Museum

Sample Data:
{"data":[
{
"Museum_id": "B16CC26B-D535-4CB5-BDBD-0186C8ED74B5"
"Kode_pengelolaan": "MS000346"
"Name": "MuseumGunungApiBatur \ / Volcanology"
"Tablespoon": "0",
"Alamat_jalan": "Jl.Raya Pengelokan"
"Desa_kelurahan": "-",
"Districts": "Kintamani"
"Kabupaten_kota": "District. Bangli"
"Province": "Prop. Bali",
"Latitude": "- 8.2838530"
"Longitude": "115.3644660"
"Collection": "0",
"source of funds":"-",
"Managers": "Inaugurated May 10, 2010. The Ministry of Energy and Mineral Resources."
"Type": "Special",
"Standard", "C",
"Tahun_berdiri": "0",
"building":"-",
"Luas_tanah": "0",
"ownership status":"-"
},
{
"Museum_id": "5E75EE4E-CAC7-4110-9B11-97C902154C12"
"Kode_pengelolaan": "MS000171"
"Name": "UPTD Museum Subang"
"Tablespoon": "0",
"Alamat_jalan": "Work Wisma Jl. Ade Irma Suryani No. 2",
"Desa_kelurahan": "-",
"Districts": "Cibogo"
"Kabupaten_kota": "District. Subang"
"Province": "Prop. Jawa Barat",
"Latitude": "- 6.5714020"
"Longitude": "107.7580670"
"Collection": "211",
"source of funds":"-",
"Managers": "Government District. Subang via UPDT Disbudparpora and Museum districts. Subang"
"Type": "General",
"standard":"-",
"Tahun_berdiri": "2003";
"building":"-",
"Luas_tanah": "0",
"ownership status":"-"
}
]}

Explanation column:
1. museum_id: no identity,
2. kode_pengelolaan: museum underlying code,
3. name: Name of the Museum,
4. tbsp: the number of managers,
5. alamat_jalan: address,
6. desa_kelurahan: address,
7. districts: address,
8. kabupaten_kota: address,
9. province: address,
10. latitude: Position mapping coordinates,
11. Longitude: Position mapping coordinates,
12. collection: The number of existing collections
13. sumber_dana: sources of funding,
14. manager: manager of the museum,
15. Type: type of museum,
16. Standard: Standard coding museum,
17. tahun_berdiri: years of existence the museum,
18. buildings: building information,
19. luas_tanah,
20. status_kepemilikan: Government or the Foundation

Once we determine the location API to be used, the GPS feature on a mobile device will determine the location in real time. The location used to find the nearest museum. If there is, the application will display the data of the museum.

2.6 Analysis of Non-Functional Requirements

Non-functional analysis is the analysis needed to determine the specifications of the needs of the system. The specification also includes elements or components of what is needed for the system to be built until the system is implemented. The needs analysis also determines the specifications of the required input system, the output will be built until the system is implemented. The needs analysis also

determines the specifications of the required input system, outputs to be produced systems and processes needed to process inputs to produce a desired output.
In non fully functional system requirements analysis is described an analysis of the hardware (hardware), software (software) and user (user) as analysis of material deficiencies and needs that must be met in the design of the system to be implemented.

2.7 Functional Needs Analysis

Analysis of functional requirements describe the activities to be implemented in a system and explain the system requirements necessary for the system to run smoothly and according to need. Analysis of functional requirements include system requirements analysis, requirements analysis of data and modeling system. Modeling system modeled using UML (Unified Modeling Language). The stages of modeling in the analysis include a Use Case diagram, Class Diagram, Activity Diagram, Sequence Diagram.

1. Use Case Diagram
   Use Case Diagram is a model to describe the behavior (behavior) software that will be created. Here is the Use Case Diagram Figure 3.7

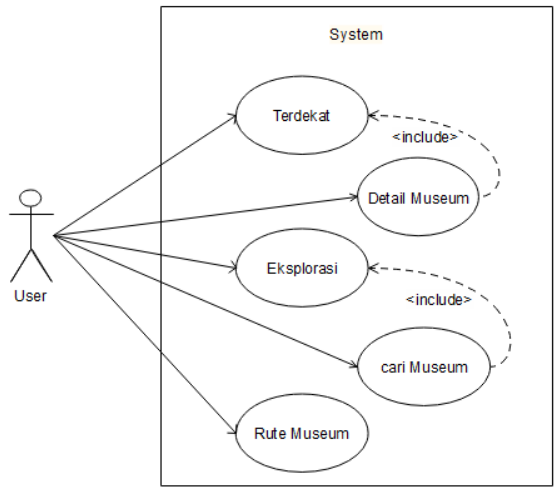


Figure 3.7 Use Case Diagram

2. Class Diagram
   Here is Figure 3.18 Class Diagram illustrating the Class Diagram Museum Go.

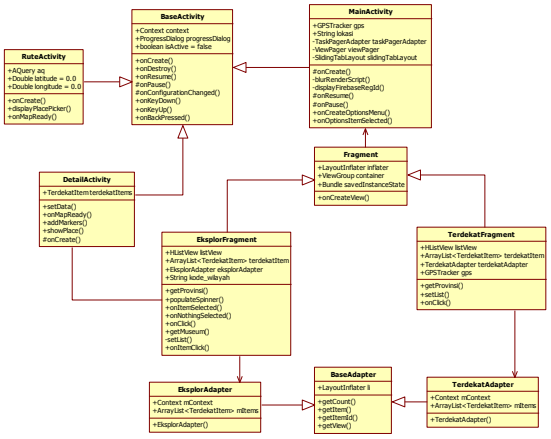


Figure 3.18 Class Diagram museum Go

Once we determine the location API to be used, the GPS feature on a mobile device will determine the location in real time. The location used to find the nearest museum. If there is, the application will display the data of the museum.

2.8 System Design

The design will begin after the analysis phase of the system is completed. The design can be diidefinisikan as the application of various techniques and principles for the purpose of defining a device, a process or system in sufficient detail to allow the physical realization. The design is described as a multi-step process in which the representation of data structures, program structure, interface characteristics, and details of the procedure, synthesized from the information requirements.

2.8.1 Architectural Design Menu

Architecture design provides the software engineer an overview of the menu structure of the program or software blueprint that will be created. The purpose of this design is to build the modular structure of the program and describes the relationship between the control of program modules. Here is an overview of the architectural design of the menu.

2.8.2 Architectural Design Menu Mobile

Here is the Architectural Design Figure 3.19 a portrait Menu Mobile menu mobile architecture.

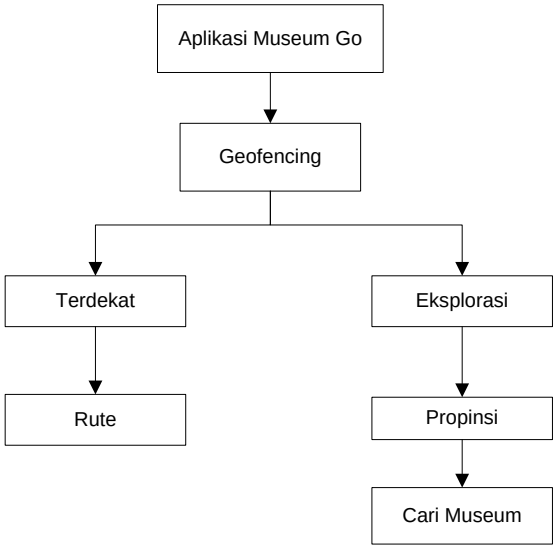


Figure 3.19 Architectural Design Menu Mobile

2.9 Interface Design

The design phase of the design aims to find the optimal form of applications to be built with consideration of factors problems and needs that exist in the system as defined in the analysis phase. In this phase, namely the efforts made by combining the use of technology hardware and software that is appropriate in order to obtain optimal and easy to implement. The design of the interface consists of one main parts: graphic design and mobile interfaces.

1. Interface Design Museum Go Here is Figure 3.20 Interface Design Museum which describes the interface Museum Go Go.

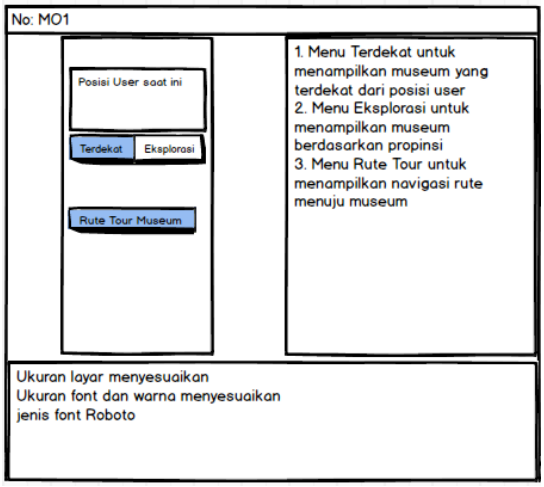


Figure 3.20 Interface Design Museum Go

2. What Menu Interface Design Here are the Menu Interface Design Figure 3.21 depicting What What Menu interface design.

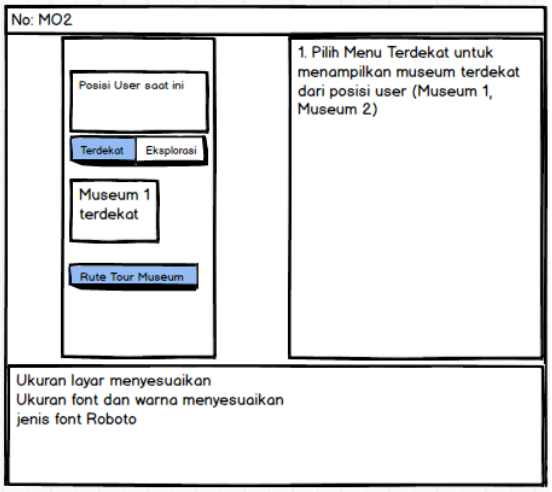


Figure 3.21 Menu Interface Design Nearby

3. Menu Interface Design Exploration Here is Figure 3.22 Interface Design Exploration portrait Menu Menu interface design exploration.

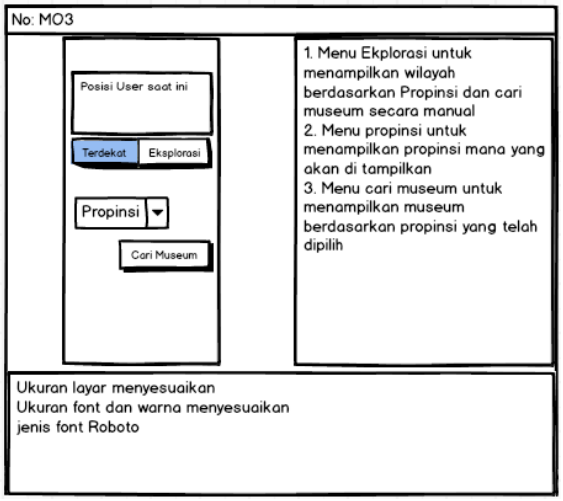


Figure 3.22 Menu Interface Design Exploration

4. Menu These Interface Design Tour Here is Figure 3.23 Interface Design Tour is a portrait Menu These menu These interface design Tour.

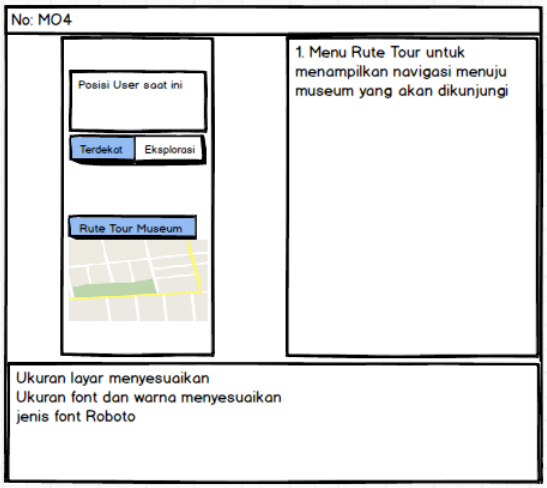


Figure 3.23 Menu These Interface Design Tour

2.10 Semantic Network

Knowledge of semantic networks is a picture graphic showing the relationship between objects (circles) and lines depicting the formation of inter-object. The semantic networks of mobile-based Application Development Geofencing can be seen in Figure 3.24

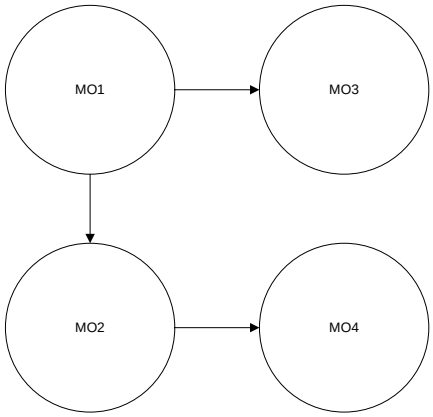


Figure 3.24 Semantic Network Mobile

2.11 Testing Systems

The software testing is a stage to find mistakes and shortcomings in the software that is built so that the bias is unknown whether the software is in accordance with the objective criteria memenihi or not.

2.12 Scenario Testing

Scenario testing will be presented in a sequence of tests to be performed on the software built. Scenario testing software that will be built is divided into two scenarios functionality testing and beta testing scenario.

1. Scenario testing functionality

   Here is the scenario testing functionality:

   a. In this test all the features of the mobile software that is built to be tested using the method of blackbox. Here is a table that describes the functionality to be tested.

Table 4.4 Scenario Testing Mobile Systems

Kelas Uji	Poin Pengujian	Jenis Pengujian
Terdekat	Detail Museum	Blackbox
	Rute Tour	
Ekplorasi	Cari Museum	Blackbox

2. Beta Testing Scenarios

   Beta test scenarios conducted directly to the user of the software using the method of data collection is by giving kusesioner to 30 users. The method used to calculate the test results are Likert Scale.

Table 4.11 Beta Testing Results With Questionnaire

Tujuan	Pertanyaan	Rata-rata	Rata-rata
1. Aplikasi Museum Go untuk para wisatawan pada platform android yang dibangun telah berhasil memanfaatkan teknologi geofencing.	Setujukah anda bahwa perangkat lunak ini sudah berhasil menemukan dan mengetahui lokasi museum?	92%	89.6%
	Setujukah anda bahwa perangkat lunak ini dapat mempermudah anda dalam mencari museum?	91%	
	Setujukah anda bahwa perangkat lunak ini dapat membantu anda untuk mengetahui lokasi museum yang terdekat dari anda?	86%	
2. Aplikasi Museum Go untuk para wisatawan pada platform android yang dibangun telah mempermudah para wisatawan untuk mencari museum.	Setujukah anda bahwa perangkat lunak ini sudah tepat dalam membantu anda dalam menemukan lokasi museum?	87%	87.15%
	Cukup mudahkah perangkat lunak museum go ini dalam menggunakannya?	87.3%	

3. CLOSURE

3.1 Conclusion

Based on the results of application testing Geo Museum using geofencing technology on android platform it could be concluded as follows:

1. Applications Museum Go to the tourists on the android platform has been built successfully using technology geofencing.
2. Applications Museum Go to the tourists on the android platform has been built to facilitate the tourists to find the museum.

3.2 Suggestion

Applications Museum Go to the tourists built a product that focuses on search Museum. Therefore, there are some suggestions that can be used as an alloy of software development towards the better to support the growth of users and content on the application Museum Go to the tourists. The suggestions are as follows:

1. Adding the geofencing feature that can provide event information or event at the museum.
2. Cooperation with the museum.
3. Add other tourist attractions not only the museum alone.

BIBLIOGRAPHY

[1] J. Horwitz, "Statistik pengguna internet di Asia Indonesia (slideshow)," TECHINASIA, 16 January 2014. [Online]. Available: https://id.techinasia.com/statistik-pengguna-internet-di-asia-dan-indonesia-slideshow/http://aect.site-ym.com/

[2] R. S. Pressman, *Software Engineering A Practitioner's Approach*, New York: McGraw-Hill Companies, 2010.

[3] DATA INDONESIA DALAM SATU PORTAL, [Online]. Available: http://data.go.id/. [Accessed 10 09 2016]

[4] N. S. H, APLIKASI BERBASIS ANDROID, Bandung: Informatika, 2013

[5] obengplus.com, "Membaca Koordinat GPS dengan Latitude dan Longitude," [Online]. Available: http://obengplus.com/artikel/articles/161/1/Membaca-Koordinat-GPS-dengan-Latitude-dan-Longitude.html#.Vh5THPmqqko. [Accessed 16 09 2016].]

[6] D. Namiot, "GeoFence Services," injoit.org (International Journal of Open Information Technologies), 2014. [Online]. Available: http://injoit.org/index.php/j1/article/view/51/48. [Accessed 19 09 2016].

[7] Chonoles, Michael Jesse, UML 2 for Dummies. John Wiley & Sons.

[8] Dharman Kasman, Akhmad, 2013. Kolaborasi Dahsyat Android dengan PHP & MYSQL. Lokomedia. Yogyakarta.

[9] Whisnu, GPS Pada Android, Jakarta: Jasakom,2012

[10] JSON Org. Pengenalan JSON. [Online]. http://www.json.org/json-id.html

[11] Hariyanto, Bambang. *Esensi-esensi Bahasa Pemrograman Java,Informatika*. 2003. Bandung

[12] H.E.T Ruseffendi. Dasar - Dasar Penelitian Pendidikan dan Bidang Non -Eksata Lainya. Bandung, Indonesia: Tarsito. 2005